



This document includes Section 14.0, YC 1607 Class: Vessels Not Self-propelled, Barges, Lighters, Barracks Craft, Floating Dry Docks, of the Draft EPA Report "Surface Vessel Bilgewater/Oil Water Separator Feasibility Impact Analysis Report" published in 2003. The reference number is: EPA-842-D-06-019

DRAFT
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Separator

Section 14.0 – YC 1607 Class: Vessels Not Self-propelled,
Barges, Lighters, Barracks Craft, Floating Dry Docks

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SECTION 14.0 – YC 1607 CLASS

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14.0 YC 1607 CLASS

The Navy's YC 1607 Class of open lighters was selected to represent the group of non-self-propelled service craft. The YC 1607 Class of open lighters is one of the most common types of service craft. There are approximately 249 of these open lighters in service and are used exclusively within 12 nautical miles (nm) from shore. These open lighters are essentially steel rafts that support staging and the movement of equipment near shipyards. The YC 1607 is divided into six watertight tanks by five transverse bulkheads. Each tank is approximately 18 feet long, 32 feet wide, and 7 feet deep. These tanks provide the necessary buoyancy for the YC 1607 Class of open lighters. Each tank is accessible to personnel through manholes located on the main deck. No machinery or equipment is installed on-board these service craft. Therefore, condensation of moisture within the craft's five watertight tanks is the primary source of bilgewater. For this feasibility analysis, bilgewater was assumed to be oily wastewater. The YC 1607 generates approximately 0.25 gallons per day (gpd) of bilgewater (Navy and EPA, 2003). Vessels in this class generate approximately 91 gallons of bilgewater within 12 nm annually.

Bilgewater generated within 12 nm from shore:

$$\frac{365 \text{ days}}{\text{yr}} \bullet \frac{.25 \text{ gal}}{\text{day}} = 91 \text{ gal/year}$$

No support services/utilities, such as electrical power, pressurized air, or seawater/freshwater piping, are available on YC Class vessels. The following MPCDs are evaluated in this feasibility analysis for YC 1607 Class vessels: collection, holding, and transfer (CHT); centrifuge; evaporator; gravity coalescence; hydrocyclone; *in situ* biological treatment; oil absorbing socks (OASs); filter media; and membrane filtration. For this analysis, bilgewater was assumed to be oily wastewater.

14.1 COLLECTION, HOLDING, AND TRANSFER (CHT)

The following sections discuss the feasibility and cost impacts of not discharging bilgewater (treated or untreated) from YC 1607 Class vessels into the environment within 12 nm of shore. This no-discharge option is referred to as the practice of CHT. The bilgewater would be transferred to shore facilities in port (including tanks, barges, and trucks).

14.1.1 Practicability and Operational Impact Analysis

This section analyzes specific feasibility criteria relative to the physical characteristics and operational requirements of CHT.

14.1.1.1 Space and Weight

There are no space and weight impacts associated with practicing CHT on YC 1607 Class vessels. YC 1607 Class open lighters are not equipped with any machinery or equipment that would generate any oily wastewater. The primary source of bilgewater for these service craft is condensation that results from moisture in the air.

14.1.1.2 Personnel/Equipment Safety

Personnel accessing the watertight tanks to offload any possible bilgewater that may have accumulated will require certifying that the tank is gas-free by a gas-free engineer or qualified crewmember (Navy, 1995). This certification is required to ensure the atmosphere within the tank has sufficient oxygen and is safe for personnel.

14.1.1.3 Mission Capabilities

Practicing CHT aboard YC 1607 Class vessels will not affect mission capabilities.

14.1.1.4 Personnel Impact

Practicing CHT as a primary control option does not require special training. No more than two crewmembers are needed to offload any wastewater that has accumulated in the bilge spaces. YC 1607 Class vessels are not equipped with bilge pumps; any bilgewater that has accumulated in the bilge is transferred to a bilge pumping/tanker truck using a suction hose.

Each YC 1607 Class vessel generates approximately 91 gallons of bilgewater annually within 12 nm. Using a suction hose from the bilge truck, an assumption was made that it would take two crewmembers about one hour to off load bilgewater. Over a year, the bilge will be pumped two or three times. The total annual labor associated with the transfer of the bilgewater is 6 hours.

$$\frac{1 \text{ hour}}{\text{event}} \bullet \frac{2 \text{ labor hours}}{\text{hr}} \bullet \frac{3 \text{ events}}{\text{yr}} = 6 \text{ labor hrs/yr}$$

No maintenance is required to perform CHT. Table 14-1 provides the annual labor hours required to perform CHT.

Table 14-1. CHT Annual Labor Hours (YC 1607 Class)

	MPCD Option: CHT
Operator Hours Within 12 nm	6
Operator Hours Beyond 12 nm	-
Condition-based Maintenance Within 12 nm	0
Condition-based Maintenance Beyond 12 nm	-
Time-based Maintenance	0
Total Time	6

14.1.1.5 Consumables, Repair Parts, and Tools

There are no requirements for consumables, repair parts, or tools associated with CHT.

14.1.1.6 Interface Requirements

There are no interface requirements associated with CHT.

14.1.1.7 Control System Requirements

There are no control system requirements associated with CHT.

14.1.1.8 Other/Unique Characteristics

No other/unique characteristics have been identified with respect to this MPCD option.

14.1.2 Cost Analysis

The following cost data and calculations are provided to allow the reader to compare costs associated with a CHT system on the YC 1607 Class vessel.

14.1.2.1 Initial Cost

Continuing to practice CHT within 12 nm on YC 1607 Class vessel does not require any equipment or vessel modifications. Therefore, the initial cost of practicing CHT is assumed to be zero.

14.1.2.2 Recurring Cost

The MPCD requires 6 personnel hours per year for transfer of bilgewater to shore, as explained under Section 14.1.1.4. The annual labor hours multiplied by the \$22.64 per hour MPCD operator labor rate produces the annual recurring labor cost of approximately \$136.

$$\frac{\$22.64}{\text{hr}} \bullet \frac{6 \text{ hrs}}{\text{yr}} = \$136/\text{yr}$$

The annual bilgewater generation rate within 12 nm is 91 gallons. Multiplying the volume of bilgewater generated annually within 12 nm by the oily waste disposal unit cost produces an annual recurring disposal cost for CHT on an YC 1607 Class vessel of \$7.

$$\frac{91 \text{ gal}}{\text{yr}} \bullet \frac{\$0.0749}{\text{gal}} = \$7/\text{yr}$$

The bilgewater generated annually within 12 nm multiplied by the oily waste disposal unit cost for Coast Guard vessels produces the annual recurring disposal cost for CHT on a YC 1607 Class vessel of \$83.

$$\frac{91 \text{ gal}}{\text{yr}} \bullet \frac{\$0.91}{\text{gal}} = \$83/\text{yr}$$

Table 14-2 summarizes the annual recurring costs of practicing CHT on an YC 1607 Class vessel.

Table 14-2. Annual Recurring Costs for CHT (YC 1607 Class)

Vessel Operating Parameter	Disposal Cost Used	Annual Recurring Cost (\$K)
Within 12 nm	Navy	0.143
Beyond 12 nm	Navy	-
Within 12 nm	Coast Guard	.219
Beyond 12 nm	Coast Guard	-

14.1.2.3 Total Ownership Cost (TOC)

Table 14-3 summarizes the TOC and annualized cost over a 15-year lifecycle of practicing CHT on a YC 1607 Class vessel.

Table 14-3. TOC for CHT (YC 1607 Class)

Cost (\$K)	Other Military Services Vessel Operation Within 12 nm	Other Military Services Vessel Operation Within + Beyond 12 nm	USCG Vessel Operation Within 12 nm	USCG Vessel Operation Within + Beyond 12 nm
Total Initial	0.0	0.0	0.0	0.0
Total Recurring	1.59	1.59	2.44	2.44
TOC (15-yr lifecycle)	1.59	1.59	2.44	2.44
Annualized	0.135	0.135	0.207	0.207

14.2 CENTRIFUGE

Based on a ship check of craft at Naval Station San Diego and information provided by service craft personnel, the Navy's Alteration and Installation Team (AIT) has concluded that there are no utilities available on the YC 1607 Class vessels to accommodate a centrifuge system (Navy, 2000). These open lighters are steel rafts used to support staging and to move equipment. Therefore, the use of centrifuges is infeasible and no further analysis will be conducted with regard to the use of centrifuges on YC 1607 Class vessels.

14.3 EVAPORATION

Based on a ship check of YC 1607 Class vessel at Naval Station San Diego and information provided by service craft personnel, the Navy's AIT has concluded that there are no utilities available on the YC 1607 Class vessels to accommodate an evaporation system (Navy, 2000). These open lighters are just steel rafts used to support staging and to move equipment. Therefore, the use of evaporation is infeasible and no further analysis will be conducted with regard to the use of evaporation on YC 1607 Class vessels.

14.4 GRAVITY COALESCENCE

Based on a ship check of craft at Naval Station San Diego and information provided by service craft personnel, the Navy's AIT has concluded that utilities are not available on YC 1607 Class vessels to accommodate a gravity coalescence system (Navy, 2000). These open lighters are just steel rafts used to support staging and to move equipment. Therefore, the use of gravity coalescence is infeasible and no further analysis will be conducted with regard to the use of gravity coalescence on YC 1607 Class vessels.

14.5 HYDROCYCLONES

Based on a ship check of craft at Naval Station San Diego and information provided by service craft personnel, the Navy's AIT has concluded that utilities are not available on YC 1607 Class vessels to accommodate a hydrocyclone system (Navy, 2000). These open lighters are just steel rafts used to support staging and to move equipment. Therefore, the use of hydrocyclones is infeasible and no further analysis will be conducted with regard to the use of hydrocyclones on YC 1607 Class vessels.

14.6 *IN SITU* BIOLOGICAL TREATMENT

In situ biological treatment of bilgewater is the addition of microbes to a vessel's bilge spaces to metabolize the oil content of the bilgewater. For *in situ* biological treatment to be effective, the microbes must be left in the bilge for a sufficient period of time to metabolize the bilgewater's oil content. According to the vendor, the most effective use of *in situ* biological treatment for the wastewater that accumulates in the bilge is to leave the *in situ* material in the bilge spaces on the vessel for a 30-day period to establish a sufficient population of microbes (Opsanick, 2000). *In situ* material could be left in the bilge spaces to reduce the oil content of any bilgewater generation that might occur. However, YC 1607 Class vessels practice CHT without significant cost or operational impacts. *In situ* biological treatment was assumed not to provide any significant environmental benefit because the treatment process is only expected to affect organic constituents, which are expected to be present at minimal concentrations for this vessel class. Additionally, the treated bilgewater would ultimately be transferred to a treatment facility. Therefore, no further analysis will be performed for the *in situ* biological treatment MPCD option.

14.7 OIL ABSORBING SOCKS (OASs)

OASs are designed to absorb oil found floating on the surface of a body of water (Sorbent Products Inc., 2000). In this application, OASs would be placed inside the bilge areas of an YC 1607 Class vessel to continuously absorb the waste oil from the bilgewater. When the OASs become fully saturated, they are manually removed and replaced with new OASs. OASs could be left in the bilge spaces to absorb the oil content of any bilgewater generation that might occur. However, YC 1607 Class vessels practice CHT without significant cost or operational impacts. OAS use was assumed not to provide any significant benefit because the treatment process is only expected to affect organic constituents, which are expected to be present at minimal concentrations for this vessel class. Additionally, the treated bilgewater would ultimately be transferred to a treatment facility. Therefore, no further analysis will be performed for the OAS MPCD option.

14.8 FILTER MEDIA

Based on a ship check of craft at Naval Station San Diego and information provided by service craft personnel, the Navy's AIT has concluded that utilities are not available on YC 1607 Class vessels to accommodate a filter media system (Navy, 2000). Furthermore, installation of a secondary treatment system such as filter media requires the installation of a primary oil water separator (OWS). Therefore, the use of filter media systems is infeasible and no further analysis will be conducted with regard to the use of filter media on YC 1607 Class vessels.

14.9 MEMBRANE FILTRATION

Based on a ship check of craft at Naval Station San Diego and information provided by service craft personnel, the Navy's AIT has concluded that utilities are not available on YC 1607 Class vessels to accommodate a membrane filtration system (Navy, 2000). Furthermore, installation of a secondary treatment system such as membrane filtration requires the installation of a primary OWS. Therefore, the use of membrane filtration systems is infeasible and no further analysis will be conducted with regard to the use of membrane filtration on YC 1607 Class vessels.